

656
310-41
File

REPORT OF DEMONSTRATION OF CONTROL METHODS APPLIED TO INFESTED ACORNS
ON THE HOOPA INDIAN RESERVATION, CALIFORNIA

cc: Craighead
Hoopa

Control of insects infesting acorns was demonstrated to the Forestry Division of the Hoopa Indian Reservation during the period September 11-15, 1939. J. E. Patterson and J. S. Yuill of the Bureau of Entomology and Plant Quarantine conducted the demonstration. The Indian Service was represented by Leonard B. Radtke, Forest Supervisor, and an Indian crew of seven CCC enrollees.

The purpose of the demonstration was to acquaint the crew foremen and control crews with the application of the control methods and their timing so that annual control could be carried out without constant technical supervision outside this Reservation's Forestry staff.

Two methods of control that had previously been tried out and proved to be successful were demonstrated. These are:

A. Burning method. Employing the use of fire. This method consists of burning the infested acorns in ground pits excavated under or adjacent to the trees shedding the acorns. The size of the pit is immaterial, but should be sufficiently large to hold all the fallen acorns within a radius of 50 feet. By the use of hand rakes the fallen acorns are easily raked into the fire pit where they are burned without fire hazard. After all the acorns in the pit are burned, or else heated to 125° F., the pit is covered with mineral soil to prevent sparks escaping and possibly starting fires in the forest.

B. Gas method. Using the gas methyl bromide as the lethal agent. This is a bottled gas in the commercial form and is available in 1 pound tin cans, the most satisfactory packaging for the required purpose. As in the burning method, a pit is excavated in mineral soil and the infested acorns are raked into it. However, this pit must be symmetrical in shape so that a gas tight cover can be applied. The cover used in these demonstrations consisted of short pieces of shiplap placed across the opening of the pit, which were in turn covered to a depth of 6 inches with moist soil. The gas is applied through a short rubber hose extending through the soil cover. A special injector is used to insert the gas. The pit is left sealed for 24 hours to permit the full lethal action of the gas.

The size of the pits used for both the fire and gas methods in these demonstrations was approximately 2 feet wide by 4 feet long by 3 feet deep. They were large enough to hold all the acorns that had fallen within a circle approximately 100 feet in diameter. Larger pits would be required for the greater mass of acorns gathered from a larger area.

The simplicity of both methods recommend them to inexperienced control crews and both are effective insect destroyers. The burning method has some advantages on this Reservation since only simple hand tools are

required in its application, as against bottled gas and gas dispensers required for the gas method. Conversely, gas treated acorns can be used for human or stock food after gassing and after the pits have been opened and exposed for a day or two, whereas fire completely destroys all acorns so treated.

The Forestry Service of the Hoopa Reservation propose to use both methods, selecting the one most suited to the site worked.

Considerable debris, consisting of an accumulation of leaves and twigs, is raked into the pits during the first operation. Subsequent treatments on the same site are free from this litter. Such debris does not prevent effective treatment by either method, but does increase the bulk of material going into the pits.

Timing of the application of either method is of paramount importance in the control of acorns infested with the acorn weevil (*Balaninus* sp.) since the larvae of this beetle are normally fully grown when the infested acorns fall and soon leave them, entering the soil to pupate. It is necessary to treat these acorns before the larvae leave them - a period which normally does not exceed two weeks. Also not all the infested acorns fall within the same short period, but continue to come down for a much longer time, so that it is necessary to cover the same ground by control two or three times at intervals of about 2 weeks. These event periods vary somewhat with the season but are easily determined by periodic examinations beginning not later than September 1st. Under normal conditions practically all infested and blighted acorns fall prior to the sound ones which limits those to be treated to the amount of the damaged part of the crop and does not greatly involve the sound nuts desired for food or reproduction.

Other insects infesting the acorns on the Hoopa Reservation include cone worms (Lepidoptera) and gall flies (Hymenoptera). The larvae of these species remain in the acorns during their full development to the adult form. However, since they are intermingled with acorns infested with the weevil this habit does not simplify the control procedure, although such acorns do not require separate treatment.

Cutting tests of infested acorns of the 1939 crop show that the ratio of sound and infested acorns in this region is:

Sound acorns	14	40%
Infested acorns	21	60%

Of the infested acorns about 12% are infested with acorn worms and 88% are infested with acorn weevils.

It is desirable to reduce this high insect damage on areas where acorns are used for food by control measures. It is believed that this is entirely feasible by employing either of the two methods described.


J. E. Patterson
Associate Entomologist

Berkeley, California
September 27, 1939